CEQA Scoping Meeting New/Revised Nitrogen Water Quality Objectives for Tributaries to Newport Bay and Revised Nutrient TMDLs for the San Diego Creek and Newport Bay Watersheds

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Outline

1. Project Description
   - Addition/Revision of nitrogen water quality objectives
   - Revision of nutrient TMDLs (adopted 1998)
2. CEQA
3. TMDL History/Background
4. Need for Project
5. Reasonably Foreseeable Methods of Compliance

CEQA = California Environmental Quality Act
TMDL = Total Maximum Daily Load (Federal program mandated by Clean Water Act to ensure achievement of water quality standards)

California Environmental Quality Act (CEQA)

- Purpose of CEQA
  - Require public agencies to consider and disclose to the public the environmental implications of their actions

- Purpose of CEQA Scoping Meeting
  - Receive public input on scope of environmental analysis and documentation for the project

- Environmental analysis must include
  - Project Description
  - Potential significant impacts
  - Review of mitigation and alternatives that will avoid impacts
  - Review of cumulative impacts

CEQA - Certified Regulatory Programs

- SWRCB’s Basin Planning Process (*handout*) is a certified regulatory program
- Subject to most “normal” CEQA requirements
- Substitute Environmental Documentation:
  - Basin Plan amendment (s)
  - Supporting staff report (technical report)
  - Checklist/environmental analysis
  - Comments
  - Responses
  - Regional Board Resolution

The Project

The Project consists of Basin Plan amendments to:

1. Revise numeric water quality objectives (WQOs) for nitrogen in San Diego Creek and incorporate new WQOs for additional tributaries to Newport Bay

2. Revise the nutrient TMDLs to address continued impairment of water quality standards in Newport Bay and its freshwater tributaries

Nutrients

- Major nutrients: nitrogen, phosphorus, potassium
- primary focus on nitrogen

Water Quality Standards

- Beneficial uses
- Water Quality Objectives
- Anti-degradation

Total Maximum Daily Load (TMDL)

A TMDL is a written plan that describes how an impaired water body will meet water quality standards.

TMDL Components:

1. Problem Statement
2. Numeric Targets
3. Source Analysis
4. Load Allocation
5. Linkage Analysis
6. Seasonal Analysis, Critical Conditions Margin of Safety
7. Implementation Plan

Historical Background and TMDL Timeline

1964-1968	San Diego Creek extended to Newport Bay. No prior reports of excessive macroalgal blooms
1974	First reports of macroalgal blooms impairing water quality
1985	Peak macroalgal bloom extending into Lower Newport Bay
1990	Regional Board issues nursery discharge permits (with load limits)
1997	IRWD wetlands begin treating half of SD Creek dry flow
1998	Regional Board adopts nutrient TMDLs; Permit issued to Caltrans requiring treatment of groundwater dewatering effluent
2005	Massive macroalgal bloom in Upper Newport Bay
2007	Deadline to achieve 50% summer nitrogen load reduction (achieved)
2012	Deadline to achieve 50% winter nitrogen load reduction (achieved)

TMDL Background (1985-1999)

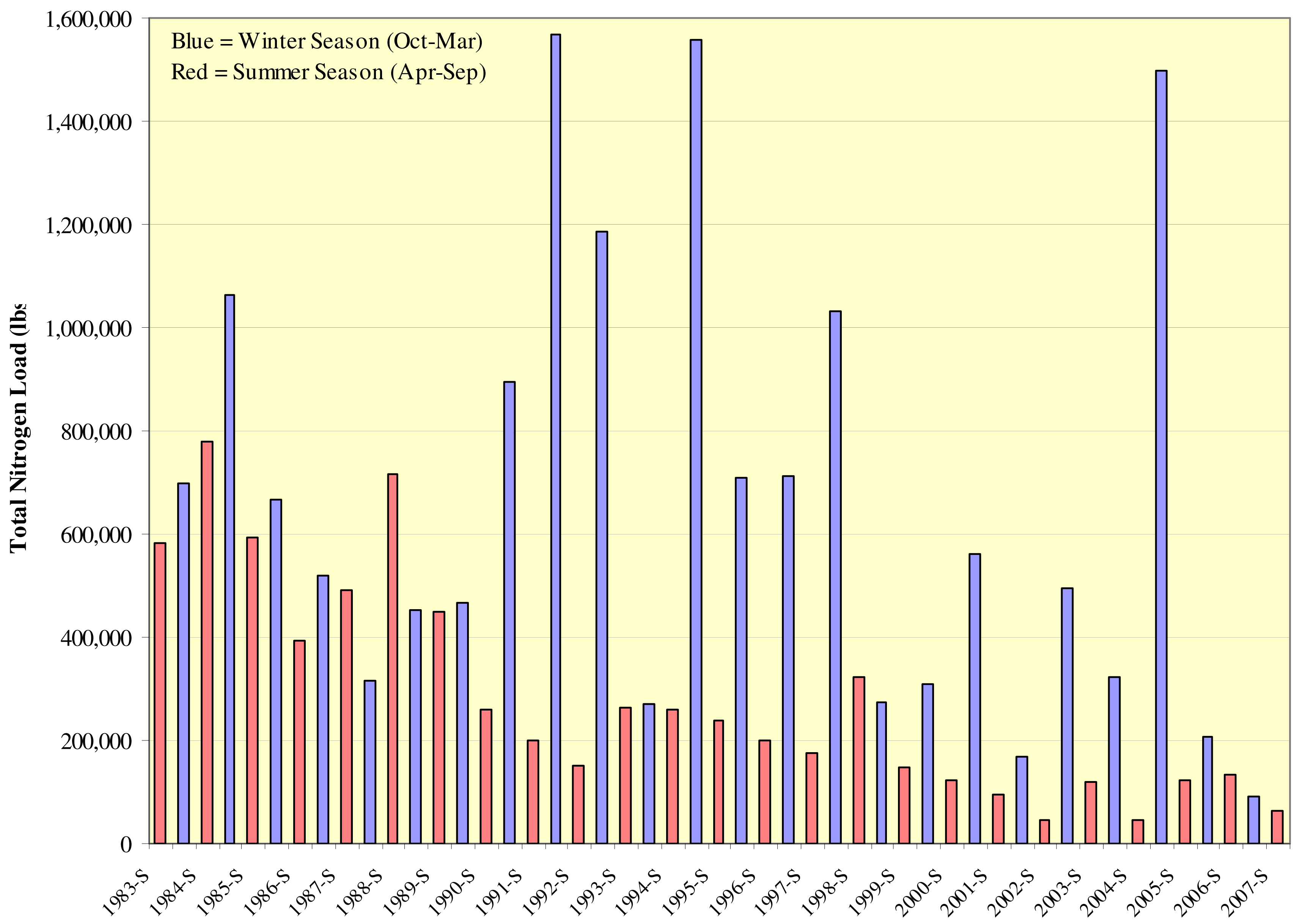
TMDL Implementation Plan Summary (1998)

Task	Description	Status
1-1	Review nitrogen objectives in San Diego Creek, revise if necessary	Studies completed, range of potential objectives identified
1-2	Establish new nursery permits	Nakase Nursery permit adopted 2005
1-3a	Revise existing nursery permits	Completed 2005
1-3b	Revise existing NPDES permits	Stormwater permit revised 2002. GW related permits revised 2003-2007
1-4	Agric. nutrient management program	Approved by Regional Board in 1999. Implemented 2000-2003
1-5	Urban Stormwater: nutrient load management analysis	Compliance evaluation submitted in 2000. Urban runoff study completed in 2006
1-6	Sediment TMDL for phosphorus	Sediment TMDL under implementation
2-1	Self-monitoring or participation in Regional Monitoring Program (RMP); investigate unknown sources	Regional Board approved RMP in 1999, studies to characterize unknown sources completed
2-2	Periodic Review	Review TMDL, WDRs and compliance schedule at least once every 3 years

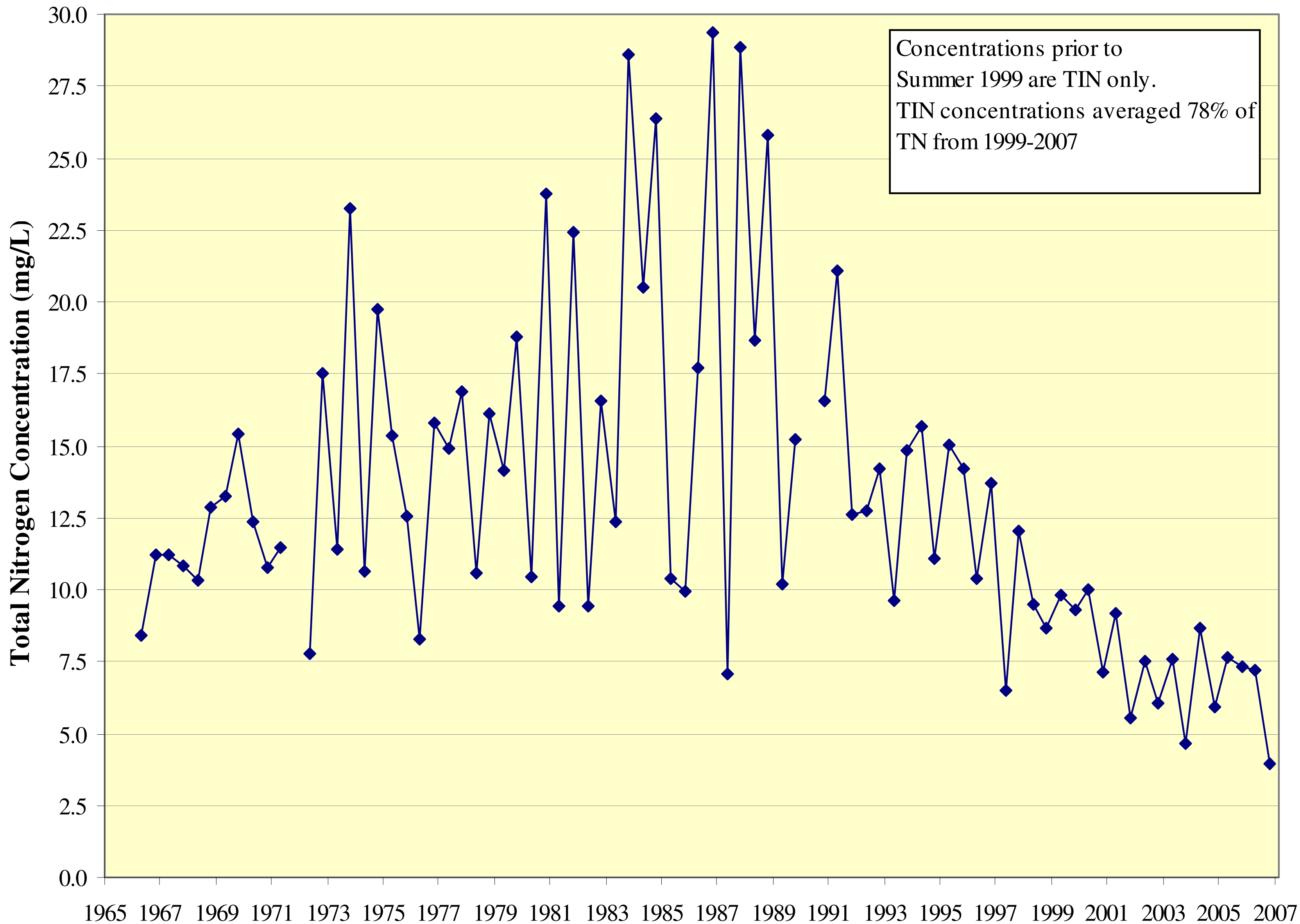
Nutrient TMDL Studies (Partial List)

1. Macroalgal Nutrient Dynamics (SCCWRP, 2002)
2. Agric. BMP Implentation (UC, 2003)
3. Sources of Se, As, Nitrogen (UC/Cal State LA, 2004)
4. Residential Runoff Reduction (IRWD 2004)
5. Landscape Outreach Program (UC 2005)
6. UNB Sediment Nutrients (SCCWRP 2006)
7. Urban Nutrient Characterization (OC, 2006)
8. Dissolved Oxygen and Macroalgae (SCCWRP 2006)
9. Watershed Algae Survey (NSMP, 2007)
10. Water Quality Modeling (RMA, 2008)

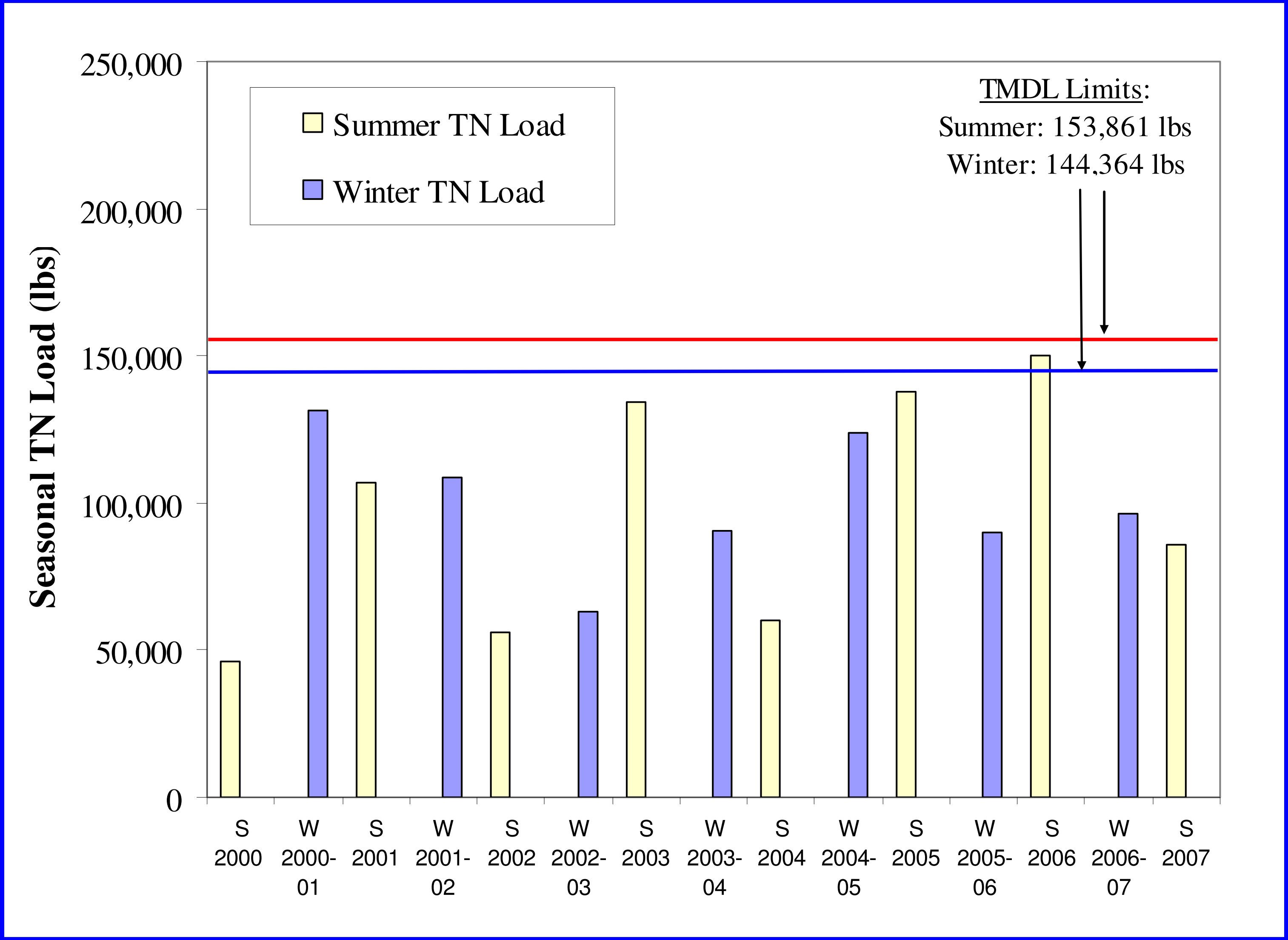
SD Creek Seasonal Nitrogen Loads:1983-2007



SD Creek Seasonal Nitrogen Conc.'s:1967-2007

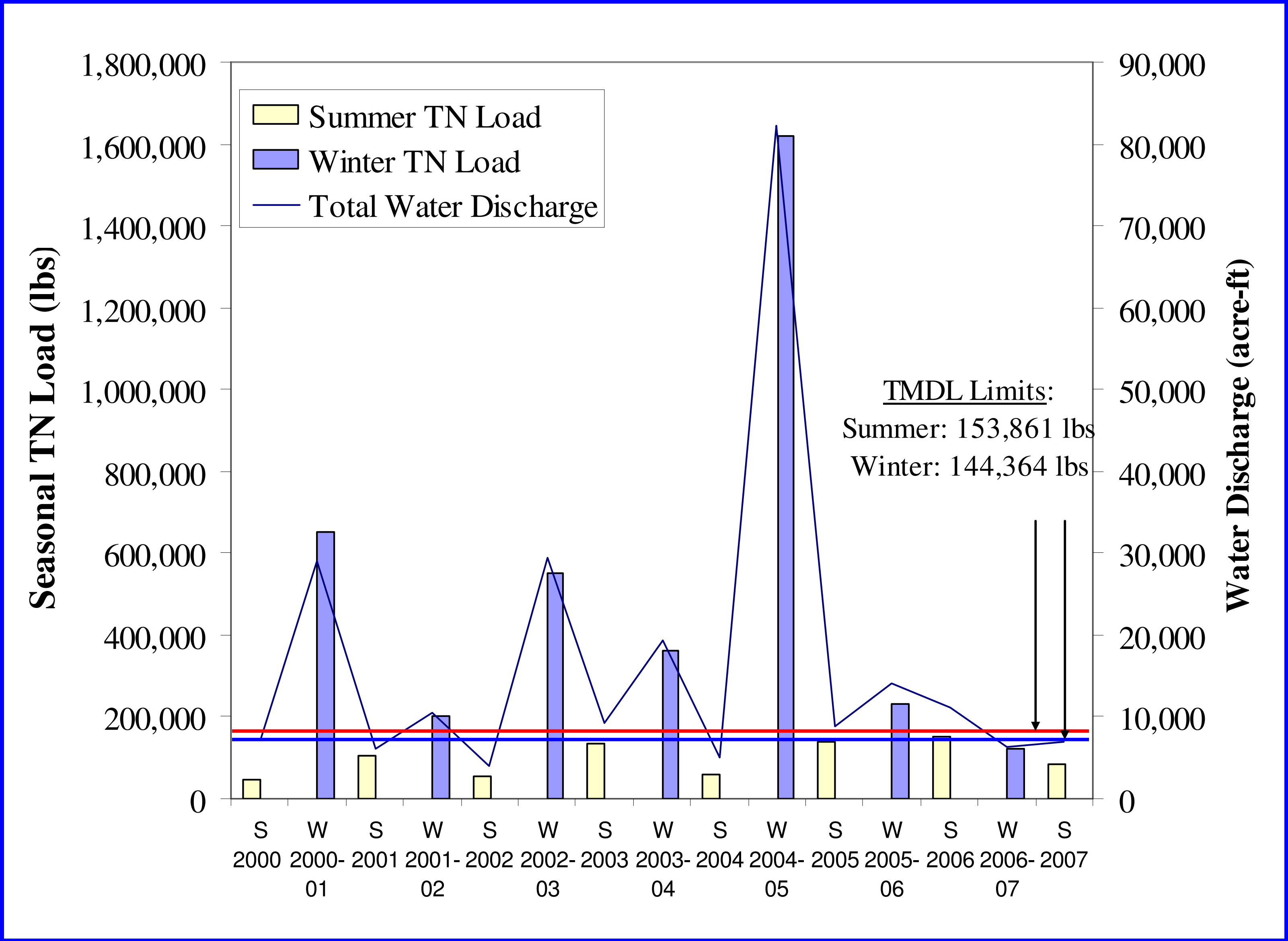


Total Nitrogen Loads to UNB: 2000-2007



** Sediment loading (in-bay nitrogen) not included*

Total Nitrogen Loads to UNB Incl. Stormflows: 2000-2007



** Sediment loading (in-bay nitrogen) not included*

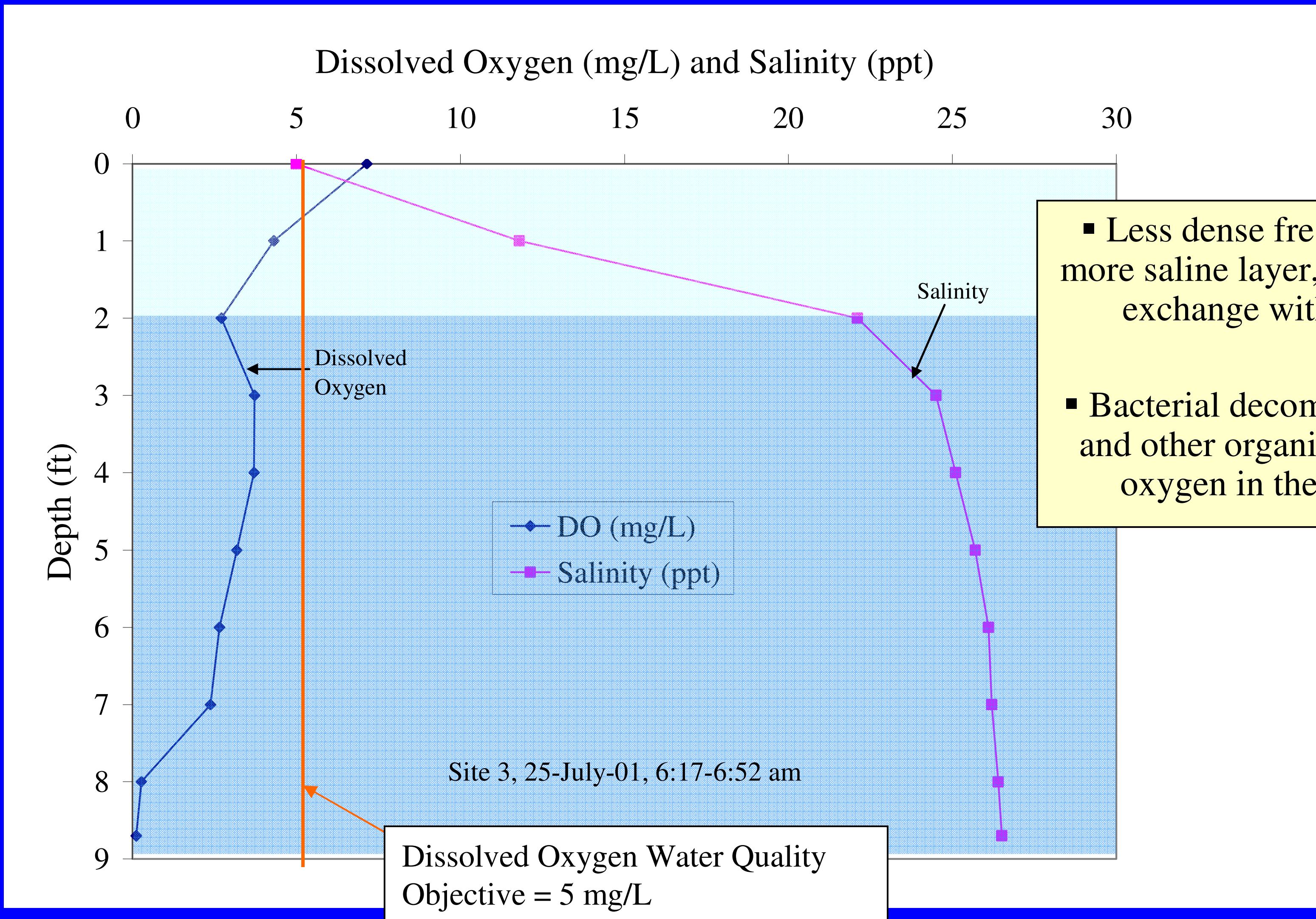
Need for Project: Achieve Water Quality Objectives and Support Beneficial Uses

1. Freshwater Creeks
   - Narrative objectives regarding “excessive algal growth” and degradation
     - Algae cover and biomass density
   - Dissolved oxygen numeric objective
   - San Diego Creek numeric objectives for nitrogen

2. Upper Newport Bay
   - Narrative objectives regarding “excessive algal growth” and degradation
     - Macroalgae cover and biomass density
     - Dissolved oxygen
   - Numeric ammonia concentration objective (toxicity)

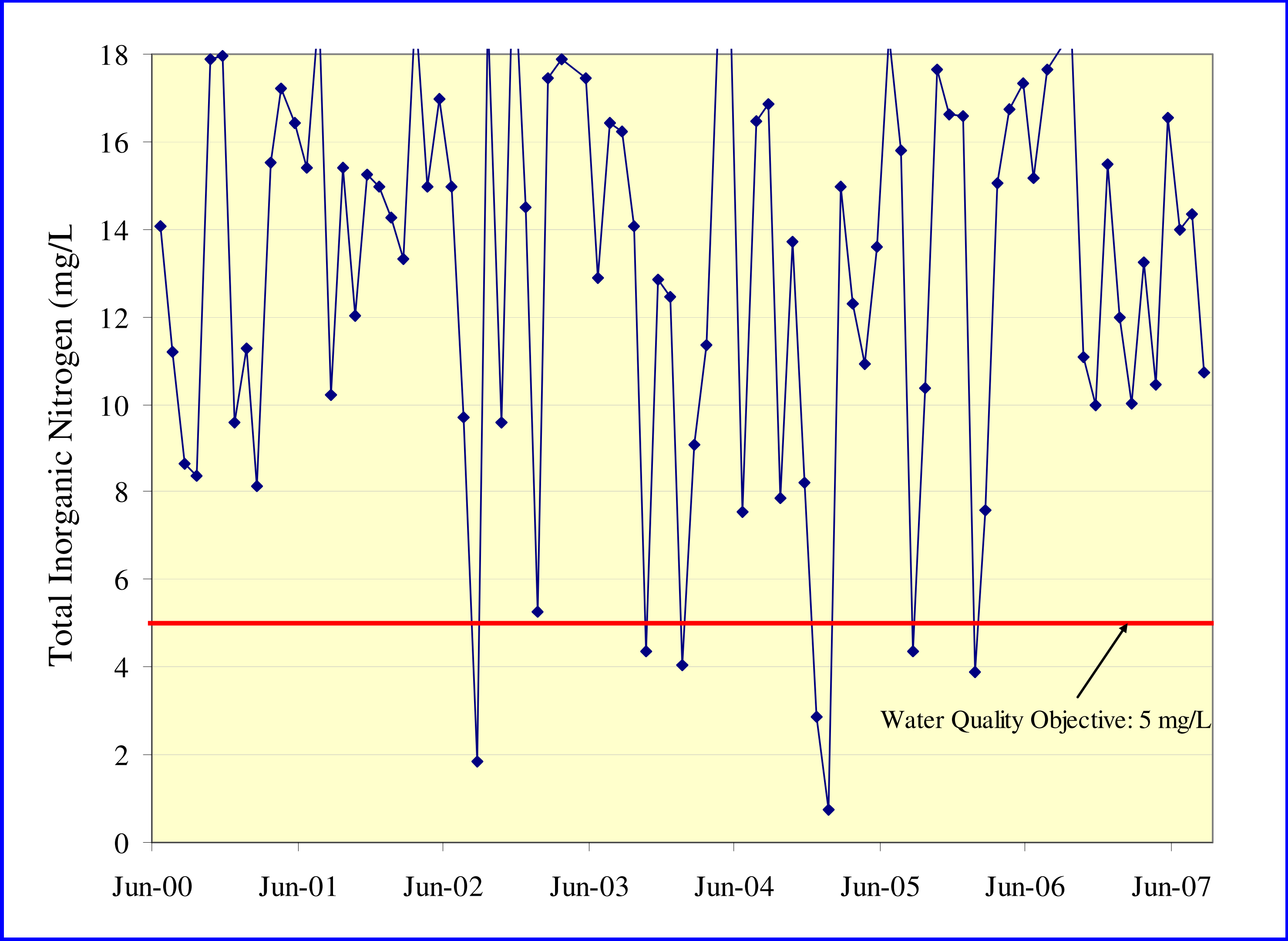
Need for Project: Eliminate low dissolved oxygen that impairs WARM and WILD beneficial uses

Need for Project – Achieve 5 mg/L Dissolved Oxygen Water Quality Objective in San Diego Creek, Reach 1



- Less dense freshwater overlies more saline layer, reducing oxygen exchange with atmosphere
- Bacterial decomposition of algae and other organic matter uses up oxygen in the bottom layer

Need for Project: Achieve 5 mg/L Total Inorganic Nitrogen Water Quality Objective in San Diego Creek, Reach 2



Need for Project: Eliminate impairment of beneficial use due to ammonia toxicity in Upper Newport Bay sediment

1. Ammonia concentrations in sediment exceed saltwater ammonia water quality objective (UNB sediment data collected in 2004)

2. Benthic infaunal community analysis
   - Benthic Response index demonstrates evidence of "high disturbance" at the head of Newport Bay (O.C. Stormwater Annual Report , Nov. 2007)

3. Toxicity Identification Evaluation suggests sediment toxicity caused by a "combination of ammonia and organic compounds" (O.C. Stormwater Annual Report , Nov. 2007)

4. Toxicity to sea urchin embryos (Newport Bay Sediment Toxicity Study, SCCWRP Tech Report No. 433, 2004)

Need for Project: Eliminate impairment of wildlife beneficial use (macroalgae cover)

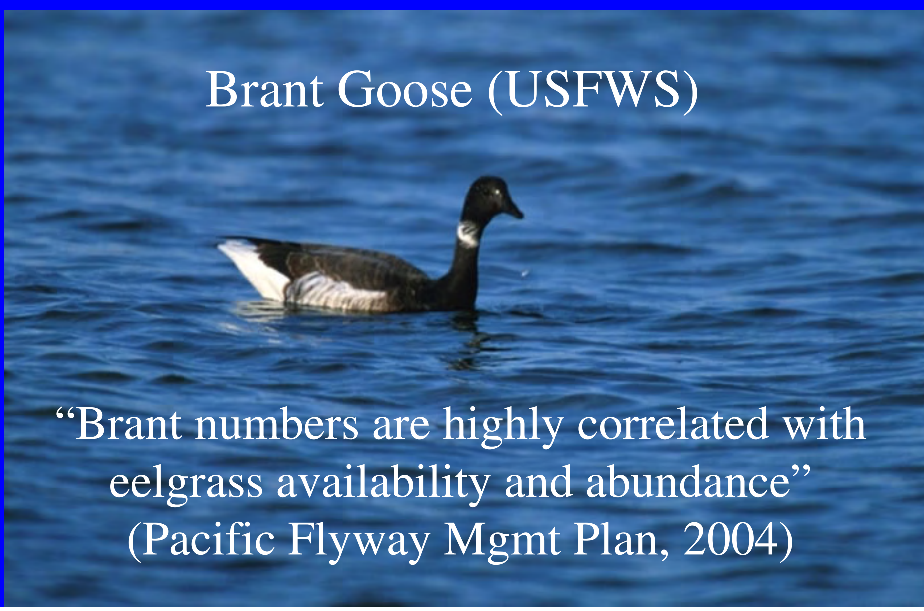
"Food Web Impacts by Blooming Macroalgae in a S. California Estuary" – L. Green, P. Fong, UCLA, Estuarine Research Foundation Conf., Nov. 2007

- Infaunal numbers were significantly lower under macroalgal mats [sediment invertebrates]
- Birds change their foraging strategy in the presence of macroalgal mats
- Shorebirds may have to spend more energy obtaining food and forage in increasingly poorer quality sites

Need for Project – Remove nutrient-related impediments to eelgrass restoration


Eelgrass in Lower Newport Bay – CRM, 2005


"numerous studies have documented the importance of eelgrass as habitat for fishes." - Valle et al. 1998


Brant Goose (USFWS)

"Brant numbers are highly correlated with eelgrass availability and abundance" (Pacific Flyway Mgmt Plan, 2004)


Seabass (DFG)

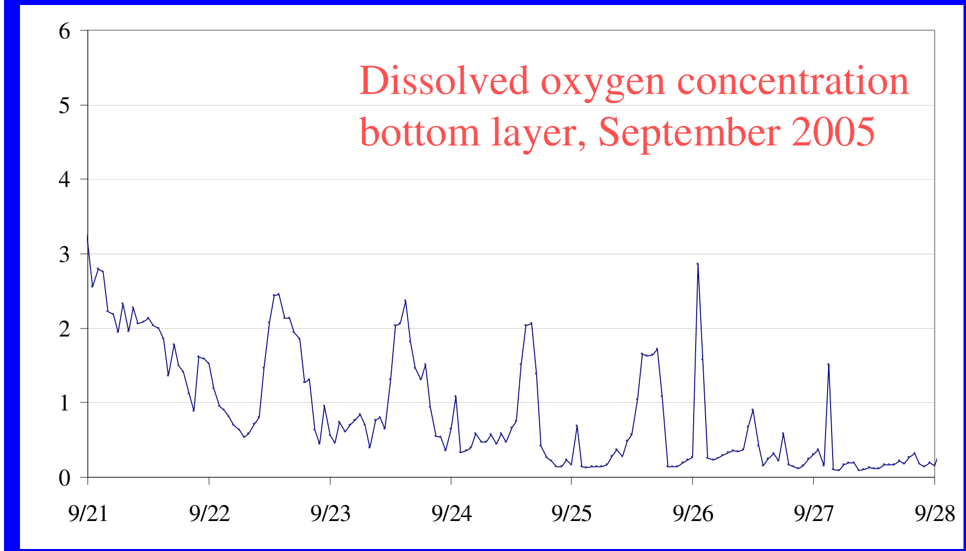

Sandbass

Literature-Based ***Nutrient-Related*** Thresholds Leading to Impairment of Eelgrass Habitat

Factor Leading to Decline in Eelgrass Habitat	**Thresholds**
Light Limitation	Growing season: Min 20% surface light
Dissolved Oxygen	Water column D.O. < 30-35% saturation (observed in UNB)
Ammonia Toxicity	25 µm in 5 wks; 125 µm in 2 wks (observed in UNB)
Sulfide Toxicity	< 0.4 mM sediment sulfide

Adapted from: *Developing Nutrient Numeric Endpoints and TMDL Tools for California Estuaries*, SCCWRP (2007)

Need for Project: Eliminate low dissolved oxygen associated with nutrients/macroalgae at the head of Newport Bay



Causes of low dissolved oxygen:

- Macroalgae die-off and decomposition
- Decomposition of fresh organic runoff from watershed
- Reduced sunlight - increased net consumption of oxygen by macroalgae
- Weak monthly tide (neap tide)
- Freshwater stratification

Need for Project – Support recreation beneficial use

Newport Dunes Beach – Oct 2005

Range of Potential Dry-Weather Water Quality Objectives

Preliminary Draft

Water Quality Objective	Dry Weather	Wet Weather
Total Nitrogen	0.5 – 3 mg/L	2 – 5 mg/L
Existing San Diego Creek Water Quality Objectives Total Inorganic Nitrogen	13 mg/L - Reach 1 5 mg/L - Reach 2	Same as dry weather objective
San Diego Creek Data Average: 2000-07 Total Nitrogen	5.9 mg/L - Reach 1 15.1 mg/L - Reach 2 (summer season)	8.3 mg/L - Reach 1 13.2 mg/L - Reach 2 (winter season)

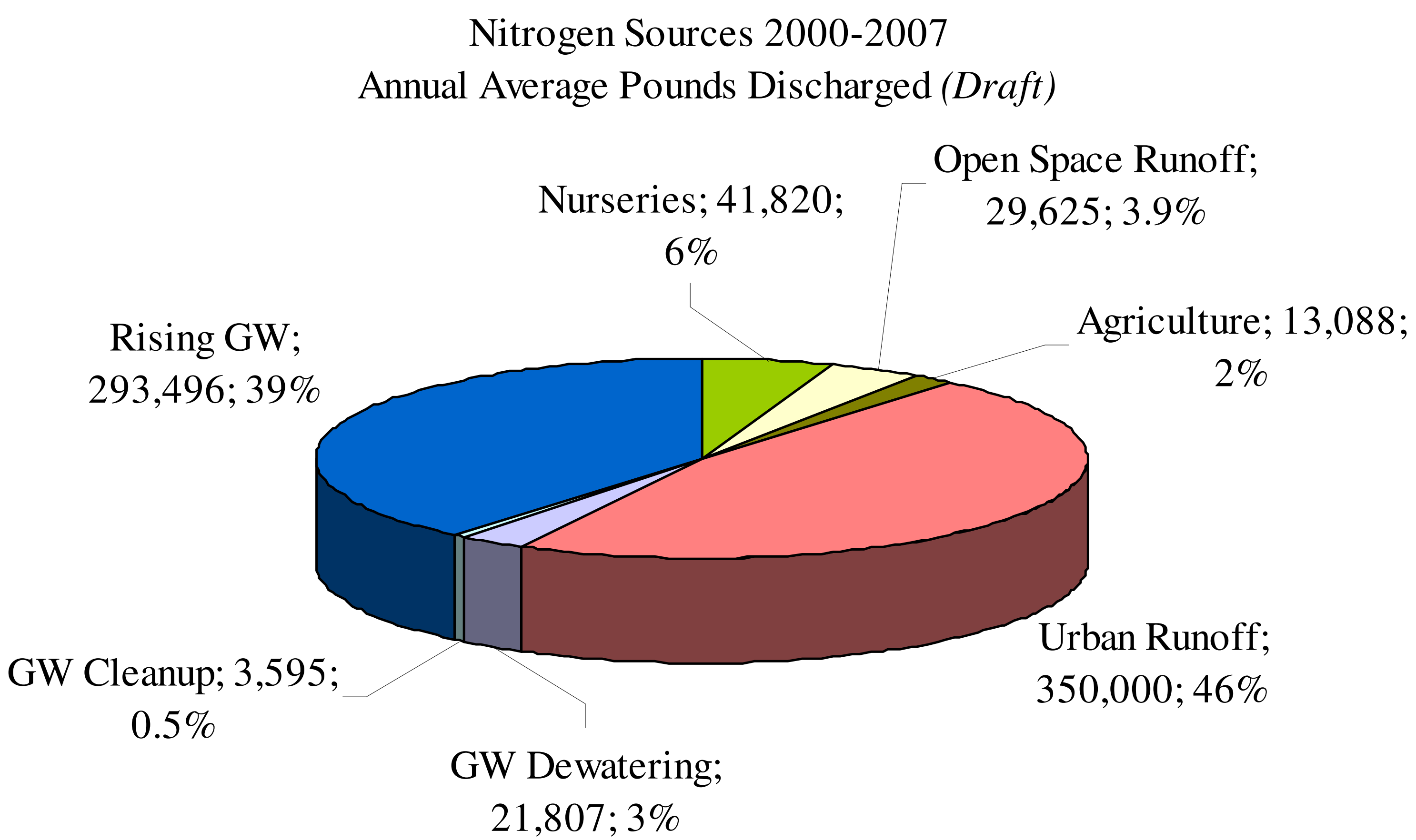
Potential Range of Revised TMDL Numeric Targets

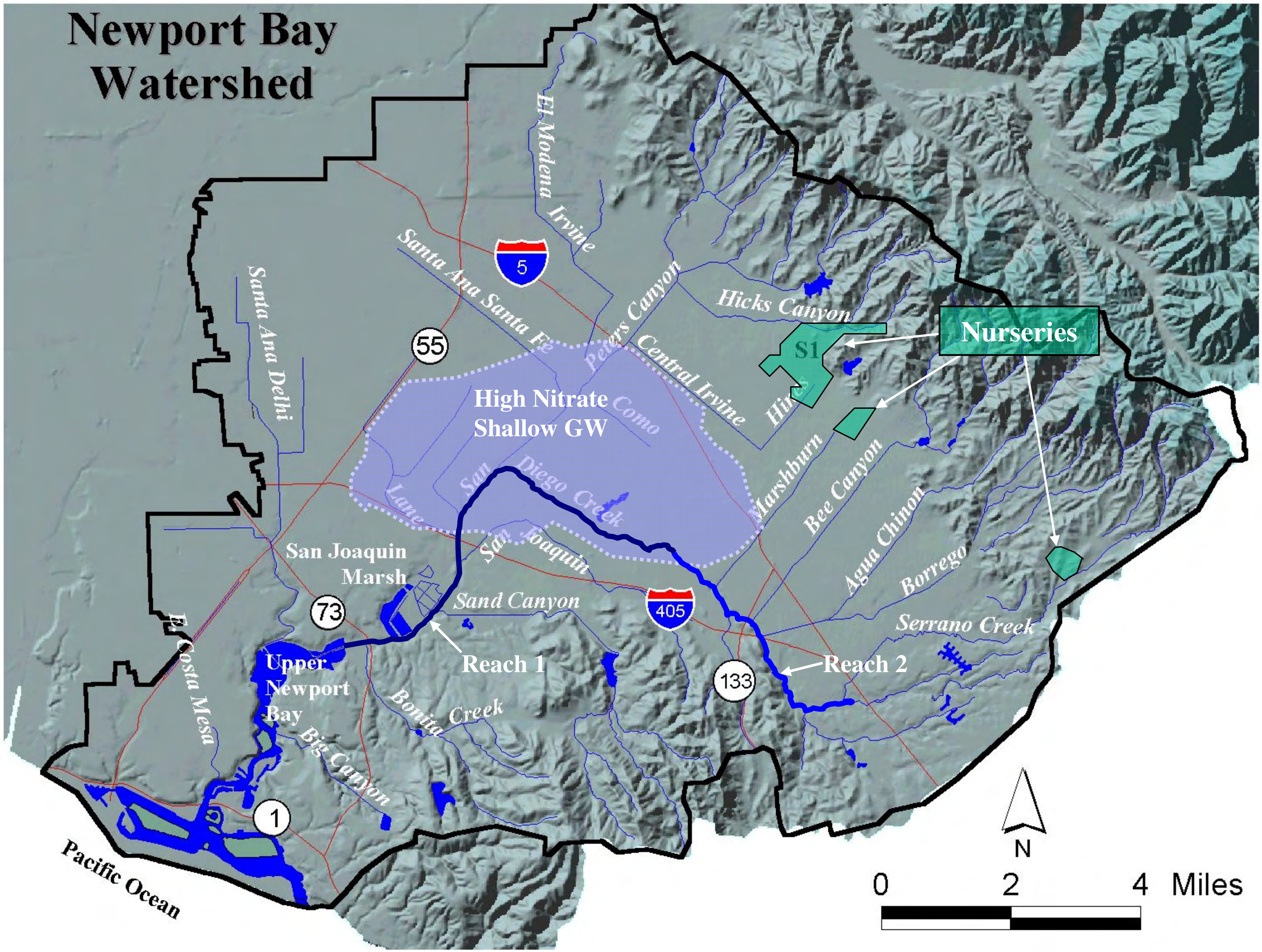
Preliminary Draft

Hydrologic Condition	Potential range of revised TMDL load target (lbs)	Data Avg. 2000-2007 (lbs)	1998 TMDL (lbs)[1]
Summer	14,000 – 85,000	104,000	153,861
Winter	155,000 – 390,000	535,000	144,364
Total Annual	169,000 – 475,000	639,000	298,225

[1] Current TMDL assigns seasonal numeric targets.
Summer season = April 1 through September 30
Winter season = October 1 through March 31; nitrogen loads from winter storms are excluded from calculation of the winter load

Where will the nitrogen load reductions come from?




Newport Bay Watershed
El Modena Irvine
Santa Ana Santa Fe
Peters Canyon
Hicks Canyon
Central Irvine
Nurseries
S1
Hines
Santa Ana Delhi
55
5
High Nitrate Shallow GW
Como
San Diego Creek
Lane
San Joaquin
Marshburn
Bee Canyon
Agua Chinon
Borrego
San Joaquin Marsh
73
Sand Canyon
405
Serrano Creek
Reach 1
Reach 2
133
Upper Newport Bay
El Costa Mesa
Bonita Creek
Big Canyon
1
Pacific Ocean
N
0 2 4 Miles

Reasonably Foreseeable Methods of Compliance

Methods already being used

- Constructed wetlands (IRWD SJ Marsh)
- Subsurface reactor (IRWD “Cienega”)
- Treatment of groundwater (Caltrans denitrification)
- Diversion to sanitary sewer (MCAS Tustin, Caltrans)
- Recycling systems (large nurseries)
- ‘Smart’ irrigation timers - rebate program (IRWD)

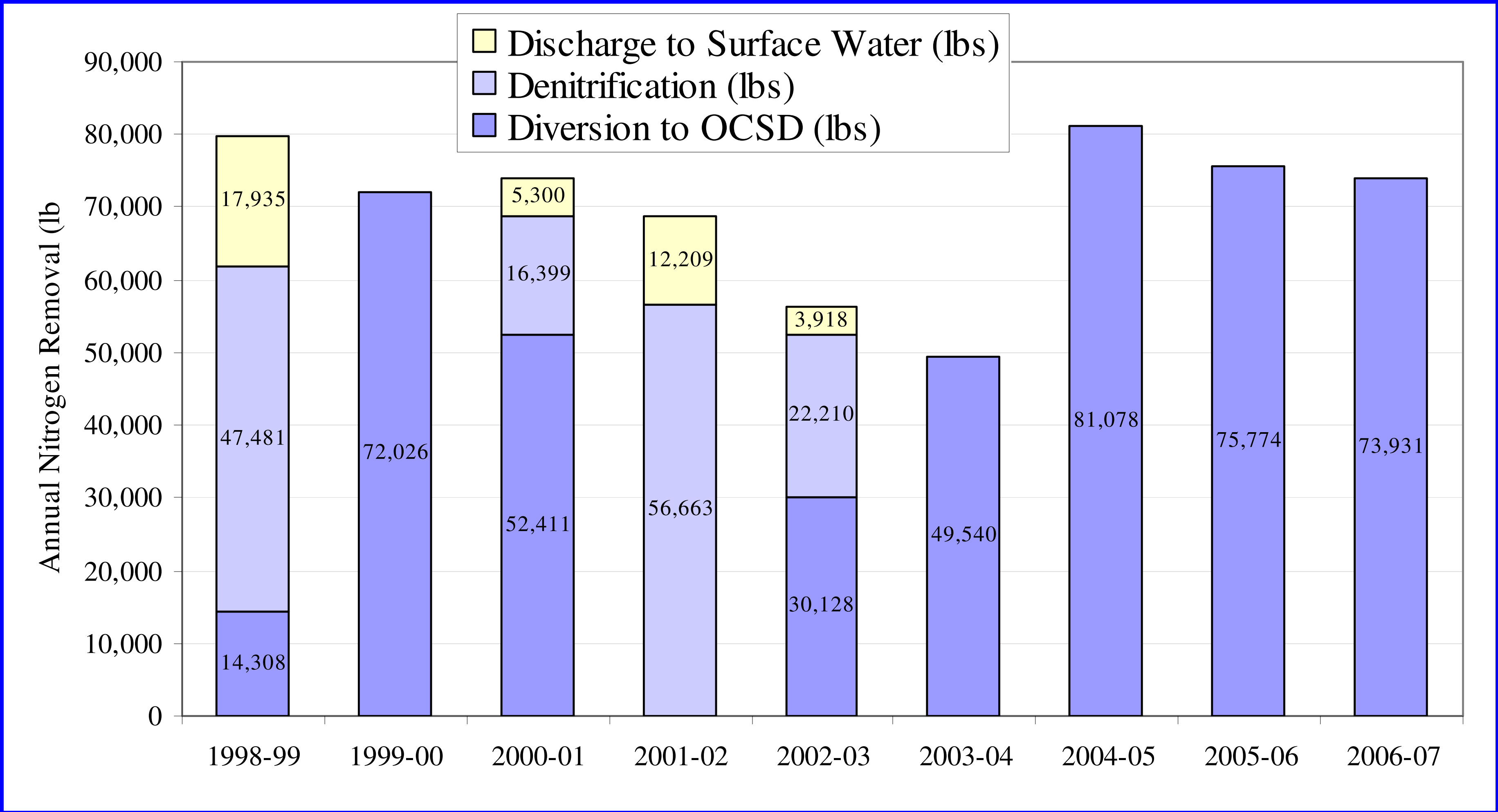
Potential new methods

- Stream restoration
- City/County ordinances (urban runoff)
- Landscape retrofits
- Low impact development (LID)

Integration with Nitrogen & Selenium Management Program

- Watershed stakeholders are engaged in collaborative project to address nitrogen and selenium related impairments
  - focused primarily on groundwater
- Program implementation is likely to include phased, prioritized program of best management practices (BMPs)
- Nutrient TMDL implementation plan will rely in part on BMPs developed through the NSMP
  - significant nitrogen reduction expected

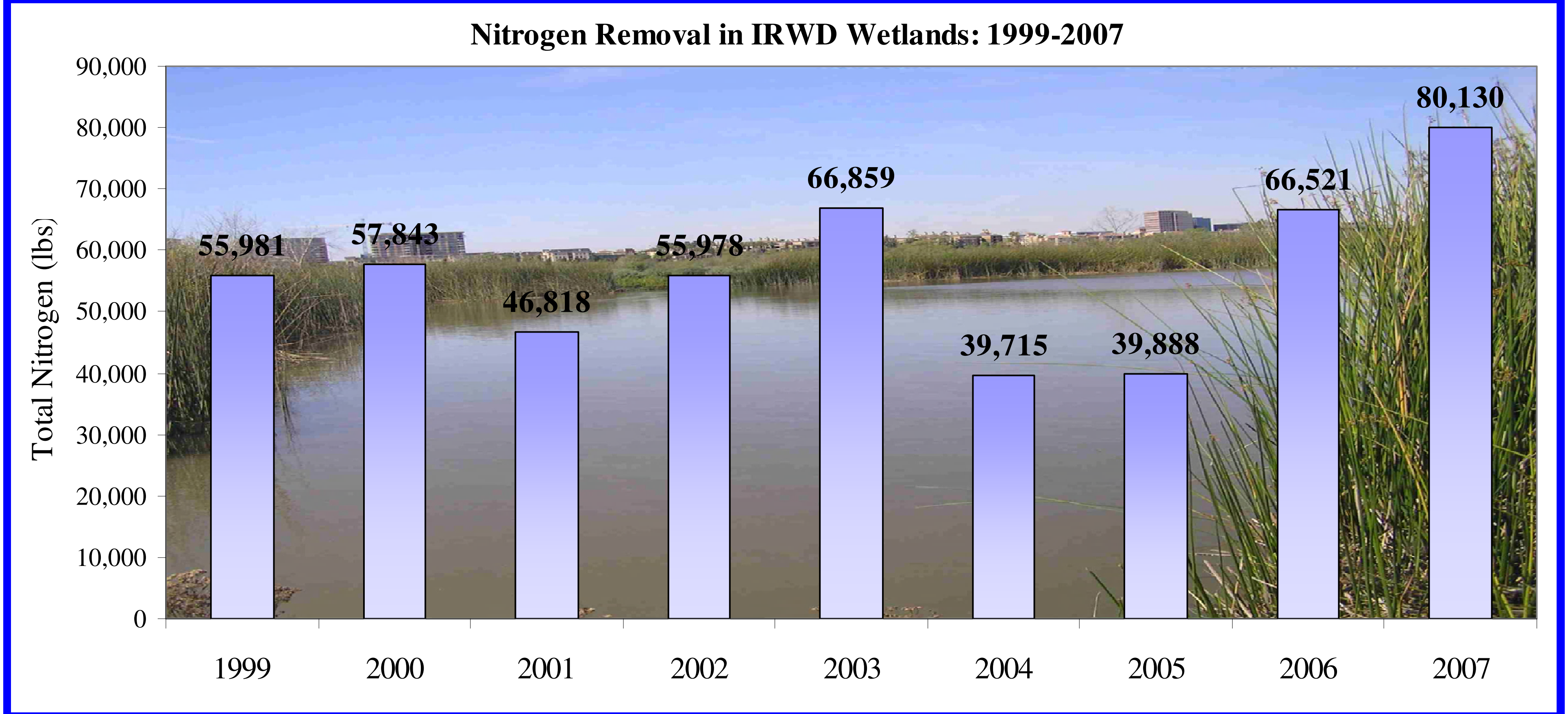
Reasonably Foreseeable Method of Compliance: GW Dewatering: Ex-situ Treatment – (e.g. Caltrans)



Reasonably Foreseeable Method of Compliance: Subsurface Wetland –(e.g. IRWD Cienega "biofilter")

- Treats surface water diverted from Peters Canyon wash
- Nitrogen reduced to non-detect levels (< 0.1 mg/L)
- Annual removal of several thousand pounds of nitrogen
- Online Oct. 2008
- Dry weather operation only
- Pilot scale only – full scale planned to be 10 times larger

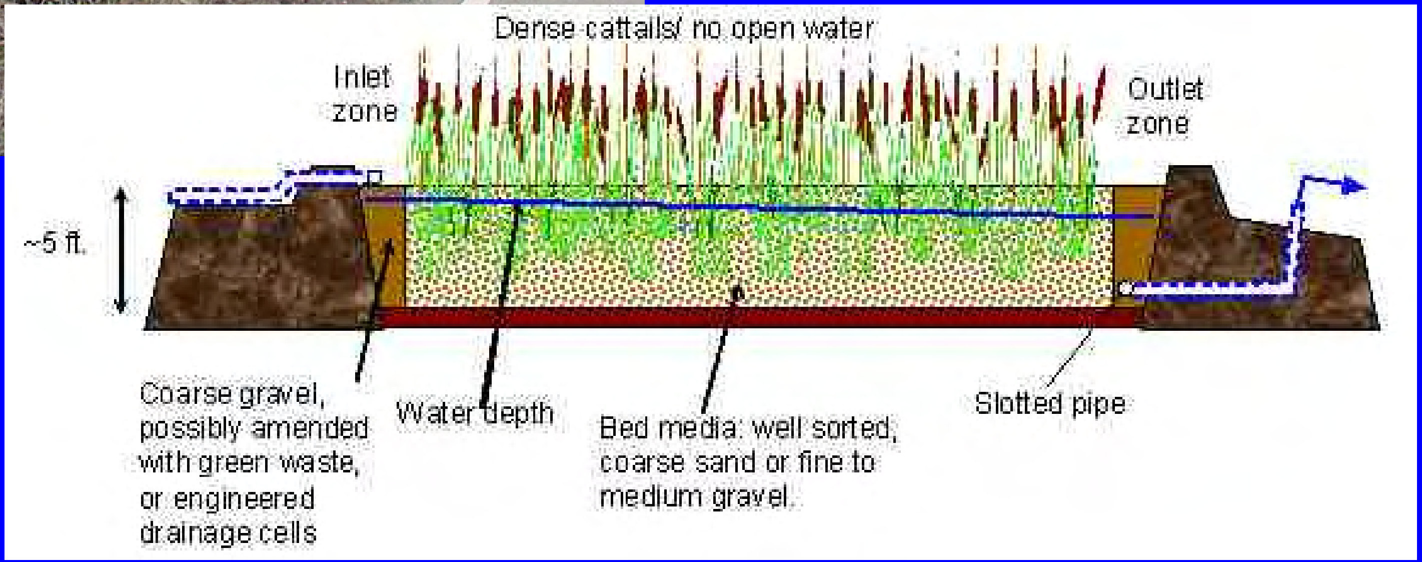
Reasonably Foreseeable Method of Compliance: Constructed Wetland (e.g. IRWD wetlands)



Reasonably Foreseeable Method of Compliance: Constructed Wetlands

Tech. Memo, Warner Channel BMP Performance and Retrofit Evaluation,

Urban Nutrient BMP Evaluation, Final Report, (County of Orange, 2006)



Reasonably Foreseeable Method of Compliance: IRWD Natural Treatment System –Offline treatment

Total Nitrogen	
Inflow	Outflow
53 mg/L	15 mg/L
Data collected Aug. 2007; Flow diverted from San Diego Creek, Reach 2 into Barranca mitigation basins	

Preliminary Design Concept Available:
Natural Treatment System EIR, March 2003,
Site 27 – Barranca offline treatment wetlands

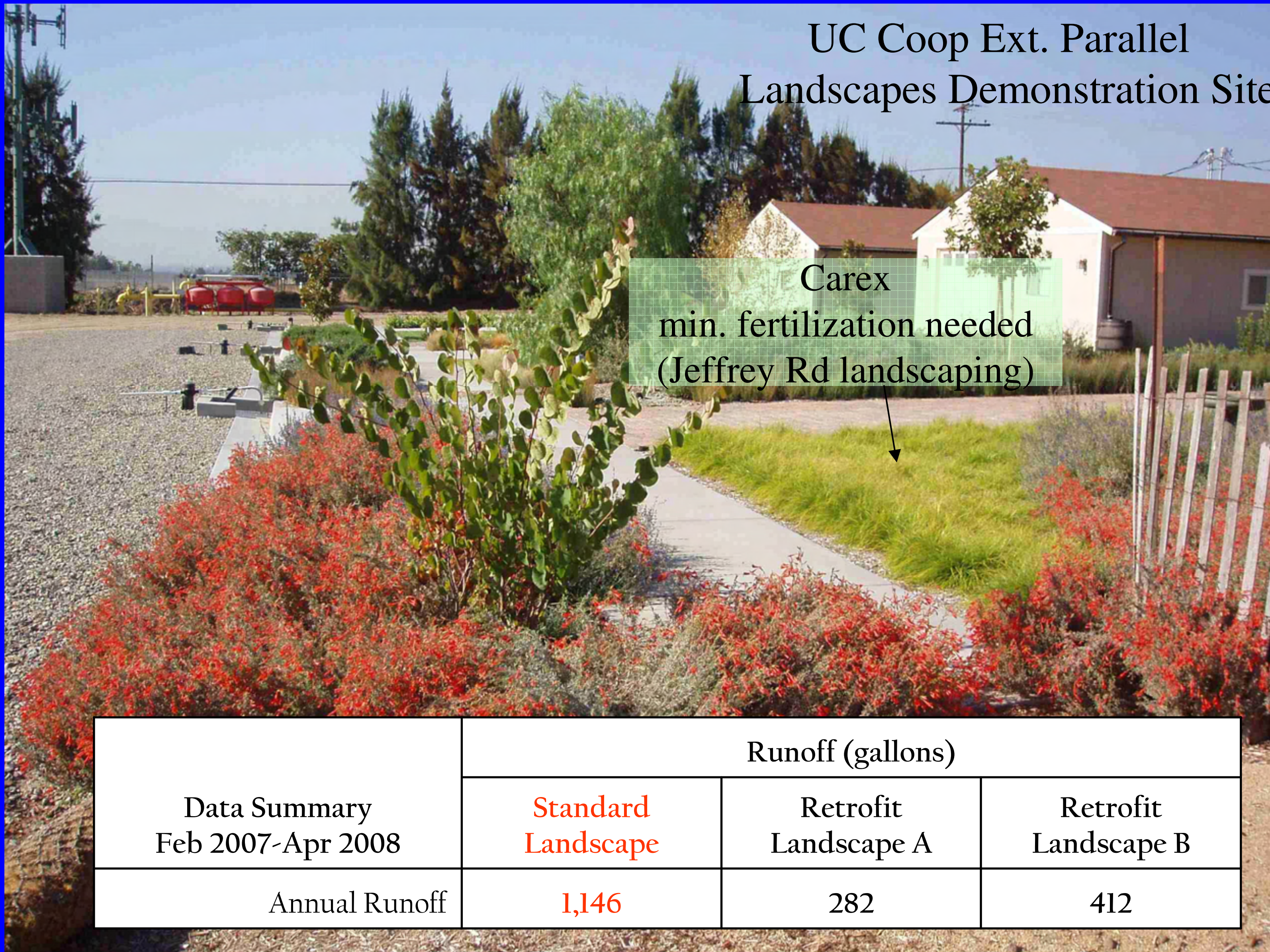
Reasonably Foreseeable Method of Compliance: Enforce existing permits

Discharge Limitations/ Prohibitions, Order No. R8-2002-0010
Stormwater (MS4) Permit, Jan. 2002:

"The permittees shall effectively prohibit the discharge of non-storm water into the MS4s unless such discharges are authorized..."

Nutrient Concentrations in Curbside Samples (County of Orange, 2006)			
Activity	**No. of Samples**	**Total N (mg/L)**	**Total P (mg/L)**
Commercial Discharge	4	**60.4**	5
Car Washing	15	10.7	1.2
Irrigation Overspray	117	5.9	1.3
Spa/Pool Draining	2	7.2	0.3
Wash Off	19	**51.4**	1.8

Reasonably Foreseeable Method of Compliance: Landscape Retrofits



Data Summary Feb 2007-Apr 2008	Runoff (gallons)		
	Standard Landscape	Retrofit Landscape A	Retrofit Landscape B
Annual Runoff	1,146	282	412

Reasonably Foreseeable Method of Compliance: Local Ordinances

Follow Minnesota's Phosphorus Lawn Fertilizer Law

*Starting January 1, 2005, fertilizers containing phosphorus cannot be used on lawns in Minnesota.

Identify the fertilizer

There are three identifying numbers on a bag of fertilizer. Find the phosphorus content by looking for the middle number.

It must be 0.

*These restrictions do not apply to fertilizers used for agricultural crops, flowers and vegetable gardening, or on golf courses by trained staff.

*Exemptions - Fertilizers containing phosphorus may be used on lawns if a soil test indicates that it is needed or if you are establishing a new lawn.

For more information go to the Minnesota Department of Agriculture website: www.mda.state.mn.us

Reasonably Foreseeable Method of Compliance: Stream Restoration

"Stream restoration techniques doubled nitrogen removal rates by microbes, and reduced nitrogen levels in groundwater by 40%, contributing to significantly lower nitrogen levels in the stream compared to un-restored conditions"

- *ScienceDaily*, May 6, 2008

Average Nitrate-N Conc.'s in Springs and Weep-holes		
Channel	Location	Avg. (mg/L)
SD Creek	Bar-Alt Spring	57.0
SD Creek	Spring @ Harvard	37.7
El Modena	Weep-hole B3	28.8

Reasonably Foreseeable Method of Compliance: Stream Restoration (e.g. Las Virgenes Creek, Calabasas)

Photos: S. Temple, Questa Engineering, SWRCB Stream Naturalization Workshop, 2008



Tentative Project Timeline

1. Draft Technical Report (December 2008)
    - Proposed Load Allocation
    - Proposed Water Quality Objectives
2. Public Workshop I (Jan-Feb 2009)
3. Peer Review (Feb-Apr 2009)
4. Public Workshop II (Apr-May 2009)
5. RWQCB Hearing (June 2009)
6. SWRCB Hearing (August 2009)
7. OAL Review (September 2009)
8. US EPA Review (October-November 2009)

CEQA Comments

- Scoping meeting
  Court Reporter - transcript
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